Intergenerational Transmission of Pro-environmental Attitudes and Behaviors: Effects and Mechanisms

Authors: Li Xin, Liu Zhenhui, Roger, Jin Tonglin, Jia Yanru, Wuyuntena, Wuyuntena

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Abstract

Intergenerational transmission in the field of environmental psychology and behavior represents a crucial fulcrum for sustainable development, primarily encompassing two dimensions: the intergenerational transmission of pro-environmental attitudes and pro-environmental behaviors. Research on the intergenerational transmission of pro-environmental attitudes has primarily focused on environmental values, environmental concern, and sustainable consumption attitudes; studies on the intergenerational transmission of pro-environmental behaviors have mainly examined energy-saving behaviors, recycling and reuse behaviors, green consumption behaviors, among others. This intergenerational transmission involves three socialization processes: (1) direct or indirect transmission from parents to children, namely forward intergenerational transmission, through role modeling, family communication, and parent-child participation; (2) reverse intergenerational transmission from children to parents, namely the process of intergenerational 反哺; (3) parents and children being influenced by a shared socio-cultural environment, namely the process of enculturation. Future research should strengthen investigations into the effects of intergenerational transmission of pro-environmental attitudes and behaviors within the context of Chinese culture, and delve deeper into their underlying mechanisms, so as to reveal how pro-environmental attitudes and behaviors are passed down from generation to generation.

Full Text

The Intergenerational Transmission Effect and Mechanism of Pro-environmental Attitudes and Behaviors

Li Xin[1], Liu Zhenhui[3], Luo Jie[4], Jin Tonglin[1,2], Jia Yanru[1], Wu Yuntina[1,2]

[1] School of Psychology, Inner Mongolia Normal University, Hohhot 010022, China
[2] Mental Health Education Research and Service Base, Key Research Base of Humanities and Social Sciences in Inner Mongolia Colleges and Universities, Hohhot 010022, China
[3] College of Teacher Education, Honghe University, Mengzi 661199, China
[4] School of Psychology, Guizhou Normal University, Guiyang 550025, China

Abstract

Intergenerational transmission in the field of environmental psychology and behavior represents a crucial pillar for sustainable development, encompassing both pro-environmental attitudes and behaviors. Research on the intergenerational transmission of pro-environmental attitudes has primarily focused on environmental values, environmental concern, and sustainable consumption attitudes, while studies on pro-environmental behaviors have emphasized energy-saving behaviors, recycling and reuse behaviors, and green consumption behaviors. This intergenerational transmission involves three socialization processes: (1) direct or indirect transmission from parents to children (forward intergenerational transmission) through modeling learning, family communication, and parent-child participation; (2) reverse intergenerational transmission from children to parents; and (3) the influence of shared sociocultural environments on both parents and children (the process of enculturation). Future research should strengthen investigations into the intergenerational transmission effects of pro-environmental attitudes and behaviors within the Chinese cultural context and explore their underlying mechanisms to illuminate how pro-environmental attitudes and behaviors are passed down through generations.

Keywords: intergenerational transmission; pro-environmental attitudes and behaviors; transmission mechanism; reverse intergenerational transmission; enculturation
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Environmental issues are critical to the sustainable development of humanity. The *Global Risks Report 2021* indicates that environmental risks have topped the world risk rankings for five consecutive years, encompassing extreme weather, biodiversity loss, and natural resource crises. Evidently, these environmental problems largely stem from human activities and detrimental environmental behaviors (Dong et al., 2017). Our pro-environmental attitudes determine what kinds of pro-environmental behaviors we will undertake. Pro-environmental atti-

tudes refer not only to individuals'attitudes toward ecological and environmental issues or specific aspects thereof (such as climate change, smog, etc.), but also to attitudes toward pro-environmental behaviors themselves (Hines et al., 1987). To achieve harmonious coexistence between humanity and nature and enhance our ecological well-being, we must cultivate appropriate pro-environmental attitudes that guide us toward more pro-environmental actions.

Pro-environmental behaviors are defined as actions that individuals consciously, voluntarily, and proactively engage in that cause minimal environmental harm or even benefit the environment (Wang Jianming & Wu Longchang, 2015). Research demonstrates that individuals' pro-environmental attitudes and behaviors are formed during childhood and continue to develop throughout adolescence (Otto et al., 2019). The family plays a crucial role in this formation process (Grusec & Davidov, 2010). Family socialization research also indicates that young people' s pro-environmental attitudes and behaviors are influenced by their primary social agents—namely, their parents (Flynn et al., 2017). This is because parents typically possess richer environmental knowledge and experience than their children (Katz-Gerro et al., 2019) and can guide and educate them in forming evaluations and judgments about environmental issues, thereby potentially influencing their children' s pro-environmental attitudes and behaviors (Grønhøj & Thøgersen, 2017). Furthermore, scholars have noted that family socialization is a bidirectional interactive process between parents and children (Kuczynski & Parkin, 2007; Žukauskiene et al., 2021). Several studies have found that parents' pro-environmental attitudes and behaviors can be reversely influenced by their children' s pro-environmental attitudes and behaviors (Damerell et al., 2013; Singh et al., 2020). When children acquire environmental knowledge through school education or media, they actively advocate for sustainable environmental behaviors and lifestyles at home (Damerell et al., 2013). What, then, is the nature of the association between parents and children regarding pro-environmental attitudes and behaviors within the family?

Intergenerational transmission is a key concept for revealing the associations between parents' and children' s traits, attitudes, and behaviors. In the field of environmental psychology and behavior, an increasing number of studies have examined the relationship between parents' and children' s pro-environmental attitudes and behaviors, uncovering intergenerational transmission effects (Ando et al., 2015; Collado et al., 2017, 2019; Katz-Gerro et al., 2019). A few studies have also identified phenomena of reverse intergenerational transmission of pro-environmental attitudes and behaviors (Singh et al., 2020; Žukauskiene et al., 2021). Investigating issues related to the intergenerational transmission of pro-environmental attitudes and behaviors can enhance our understanding of how environmentalism is transmitted between generations, help block the intergenerational spread of detrimental environmental concepts and behaviors to some extent, and promote positive intergenerational interactions regarding family environmentalism, thereby achieving sustainable environmental development. Therefore, based on theoretical and empirical research, this paper provides an in-depth analysis of the intergenerational transmission effects and mechanisms

of pro-environmental attitudes and behaviors between parents and children, exploring how these attitudes and behaviors are passed down through generations.

2. The Intergenerational Transmission Effect of Pro-environmental Attitudes and Behaviors

Currently, intergenerational transmission—as a phenomenon where psychological variables such as traits, attitudes, and behaviors are passed between parent and child generations—exists across multiple domains, including self-regulation, mental health, and social behavior. Numerous studies have also documented intergenerational transmission effects in the environmental domain and explained their nature from the perspective of environmental socialization. In the following sections, we elaborate on the concepts of intergenerational transmission and environmental socialization and their relationship, while also characterizing the phenomenon and analyzing its mechanisms through the lens of pro-environmental attitude and behavior transmission.

2.1 Intergenerational Transmission and Environmental Socialization

Intergenerational transmission refers to the phenomenon where individuals' attitudes, abilities, norms, and behaviors are transferred between parents and children through direct or indirect family interactions (Meeusen, 2014; Volland, 2013). Intergenerational correlation is considered a measure of successful transmission within families—the greater the similarity between children and parents on a given dimension, the stronger the intergenerational transmission effect (Barni et al., 2013). Intergenerational transmission has been confirmed across various research domains, including self-control, emotional intelligence, and core self-evaluation in self-regulation; attachment, anxiety, depression, and subjective well-being in mental health; trust, economic behavior, and problem behaviors in social behavior; and filial piety and cultural values at the cultural level. Additionally, in the field of environmental psychology and behavior, substantial research has identified intergenerational transmission effects for pro-environmental attitudes and behaviors (Hansen & Jacobsen, 2020; Meeusen, 2014; Oh et al., 2021).

The vast majority of current research on the intergenerational transmission of pro-environmental attitudes and behaviors explains its nature from a socialization perspective. Socialization refers to the process through which individuals acquire group and societal norms and behavioral standards from social agents to adapt to and integrate into specific groups or society (Edles & Appelrouth, 2014; Maccoby, 2007). Environmental socialization (ecosocialization) represents a specific domain of socialization, describing the process by which individuals acquire environmentally beneficial knowledge, relevant skills, attitudes, and the capacity to participate in environmental activities (Gentina & Muratore, 2012). Within the family, parents serve as the primary agents of children' s and adolescents' environmental socialization, transmitting environmental knowledge, skills,

attitudes, and behaviors through direct educational guidance, modeling, and parent-child interactions, thereby facilitating children' s capacity to engage in environmental activities. Consequently, the pro-environmental attitudes and behaviors children acquire will resemble those of their parents, demonstrating the intergenerational transmission effect of pro-environmental attitudes and behaviors.

Some scholars contend that socialization and intergenerational transmission within families reflect the same phenomenon, with the former focusing on the process of individual developmental change and the latter on the outcomes of psychological development and their relationship to parents during this process (Guo Pingping & Xin Ziqiang, 2020). Intergenerational correlation results from the transfer of values, attitudes, and behavioral patterns within families, primarily due to parents' continuous and cumulative influence on their children. Therefore, the family pathway of environmental socialization corresponds to the pathway of intergenerational transmission of pro-environmental attitudes and behaviors, and research on transmission mechanisms can draw upon socialization studies. The following sections primarily explore the intergenerational transmission effects and underlying mechanisms of pro-environmental attitudes and behaviors.

2.2 Intergenerational Transmission of Pro-environmental Attitudes

According to the theory of ecological attitudes (Wiseman & Bogner, 2003), pro-environmental attitudes refer to individuals'attitudes toward objective ecological phenomena, environmental issues, or pro-environmental behaviors, encompassing environmental values, environmental concern, and sustainable consumption attitudes. Below, we review the intergenerational transmission effects of these three types of pro-environmental attitudes.

(1) Intergenerational transmission of environmental values. Environmental values refer to the degree of value individuals perceive regarding ecological and environmental issues (De Groot et al., 2008) and constitute the core and foundation of pro-environmental attitudes. Empirical research on the intergenerational transmission of environmental values remains relatively scarce. Scopelliti et al. (2022) examined the relationship between family environmental values and children' s environmental values in an Italian cultural context by asking participants about the importance of environmental protection to themselves and their parents. The results revealed a significant positive correlation between perceived parental environmental values and children' s environmental values, with fathers' environmental values effectively predicting children' s pro-environmental behaviors. Meanwhile, Oh et al. (2021) emphasized that different family values exert varying influences on individuals' attitudes toward nature. Their survey of 1,519 Singaporean adults (aged 18 and above) on the relationship between family values, nature connectedness, and nature experiences found that biospheric and altruistic family values positively predicted individuals' nature connectedness and experiences, whereas egoistic values negatively

correlated with nature connectedness. Evidently, perceived family biospheric values positively correlate with individuals' nature connectedness, and both environmental values and nature connectedness are important factors influencing environmental behaviors (Whitburn et al., 2019). Both studies examined the association between perceived parental environmental values and individual environmental values from the children' s perspective, yet the actual parental environmental values and their transmission remain unclear. Future research should employ continuously tracked parent-child dyad samples to investigate the dynamic associations between parental and children' s environmental values in real-life contexts, thereby better confirming the robustness of environmental value transmission effects.

(2) Intergenerational transmission of environmental concern. Environmental concern refers to people' s awareness of environmental problems and willingness to address them (Dunlap & York, 2008) and is considered an operational definition of pro-environmental attitudes (Teng Han & Fang Ming, 2017; Rhead et al., 2015). Meeusen (2014) surveyed 3,426 Dutch junior high school students and 2,305 parents regarding their environmental concern levels. Standardized parameter estimates indicated that both fathers' and mothers' environmental concern could predict adolescent children' s environmental concern, with the explanatory rate for girls' environmental concern ($R^2 = 0.148$) being twice that for boys ($R^2 = 0.077$). Similarly, Casaló and Escario (2016) analyzed the intergenerational transmission of environmental concern using data from the 2006 Programme for International Student Assessment (PISA), which included 52,840 participants across 16 countries. The study primarily examined parents' and children' s concern levels regarding environmental issues such as energy shortages, animal and plant extinction, and air pollution, revealing positive correlations between fathers' and mothers' environmental concern and their children' s concern. Moreover, parental environmental concern exhibited a stronger influence on girls' environmental concern than on boys' , suggesting that girls may be more susceptible to parental environmental concern than boys and that the intergenerational transmission of environmental concern may show gender differences among offspring. These studies explored intergenerational correlations between father-child and mother-child dyads regarding environmental concern but overlooked how parental consensus might affect this transmission —an issue requiring future investigation. Additionally, given that women typically display more pro-environmental attitudes in family contexts (Xia & Li, 2022), mother-child intergenerational correlations may be stronger than father-child correlations, warranting deeper exploration of transmission effects across different gender configurations in parent-child dyads.

(3) Intergenerational transmission of sustainable consumption attitudes. Sustainable consumption attitudes refer to individuals' beliefs, emotions, and willingness to engage in sustainable consumption activities (such as purchasing green products, recyclable items, and products with minimal plastic packaging) (Essiz & Mandrik, 2021), with attitudes toward green product selection also reflecting pro-environmental attitudes. Aruta and Paceño (2022)

surveyed 437 parent-adolescent dyads in the Philippines regarding green purchasing attitudes, using Yadav and Pathak' s (2016) scale to measure attitudes toward purchasing environmentally friendly products. Both parents and children rated the goodness, popularity, pleasantness, and rationality of purchasing green products. The results showed that parents' green purchasing attitudes directly predicted their adolescent children' s green purchasing attitudes, indicating that more positive parental attitudes toward green purchasing corresponded to more positive attitudes among their children. Additionally, Essiz and Mandrik (2021) validated the intergenerational transmission effect of sustainable consumption attitudes in a Turkish cultural context, surveying 146 mother-university daughter dyads. Using the item "Choosing environmentally friendly products is important to me" to assess sustainable consumption attitudes, they similarly found significant intergenerational transmission of sustainable consumption attitudes between mothers and daughters, with peer influence and family communication explaining 26% of the variance.

The above studies sampled participants from the Philippines and Turkey, both considered collectivist cultures. Integrating these findings suggests that the intergenerational transmission of sustainable consumption attitudes may exhibit cross-cultural consistency within collectivist cultural contexts. Future research should systematically compare the intergenerational transmission of sustainable consumption attitudes across different cultures to reveal both universal and culturally specific patterns.

Some studies have found similar pro-environmental attitudes between parents and children (Litina et al., 2016; Scopelliti et al., 2022), while others have reported low correlations between parental and children' s pro-environmental attitudes (Verachtert, 2022) and weaker environmental values among children compared to their parents (Casaló & Escario, 2016). These inconsistent results indicate that the intergenerational transmission of pro-environmental attitudes may be a complex process dependent on different underlying mechanisms or boundary conditions. Moreover, the aforementioned cross-sectional studies examined intergenerational correlations in pro-environmental attitudes through correlation and regression analyses, which cannot establish causal mechanisms. Therefore, causal inferences must be made cautiously. Future research should employ experimental and longitudinal tracking methods to clarify the causal relationships between parental and children' s pro-environmental attitudes.

2.3 Intergenerational Transmission of Pro-environmental Behaviors

According to the theory of planned behavior (Ajzen, 1985), pro-environmental behaviors represent the external manifestation of pro-environmental attitudes and can reflect individuals' attitudes to a certain extent, with the two being strongly correlated. Research has found that not only do parents and children share similar pro-environmental attitudes and values, but their pro-environmental behaviors also show consistency (Grønhøj & Thøgersen, 2017). Below, we examine three categories of pro-environmental behavior transmis-

sion: energy-saving behaviors, recycling and reuse behaviors, and sustainable consumer behaviors, consistent with classifications in existing research (Jia & Yu, 2022; Katz-Gerro et al., 2019).

(1) Intergenerational transmission of energy-saving behaviors. Wallis and Klöckner (2018) investigated the intergenerational transmission of energy-saving behaviors among 264 adolescent-parent dyads using regression analysis and multilevel modeling. The results revealed significant correlations between parents' and adolescents' energy-saving behaviors, with adolescents' perceptions of parental energy-saving behaviors serving as a mediator. Handy et al. (2021) similarly found significant positive correlations in electricity and water conservation behaviors among 571 South Korean parent (aged 42-61) and adult child (aged 18-28) dyads. However, the motivations underlying pro-environmental behaviors differed between generations, with parents more driven by environmental motives and children more likely motivated by economic, habitual, and family pressure factors. Researchers attribute these divergent motivations to the different social contexts shaping each generation' s behavioral drivers. These studies relied on self-reports from questionnaires or interviews. Given the gap between self-reported and actual behaviors, some researchers have used objective data to reflect actual pro-environmental behaviors. Hansen and Jacobsen (2020) employed quantitative methods and real data to examine the intergenerational transmission of energy consumption between Danish mothers and their adult children. By analyzing actual energy consumption data (in kWh) from 128,472 adult children' s households and their parental households between 2010 and 2015—where the dependent variable was calculated as the ratio of annual household heating and hot water consumption to housing area—the study could infer actual pro-environmental behaviors. The findings indicated significant positive correlations in energy consumption between adult children and parents: for every 1% increase in parental household energy consumption, adult children' s average consumption increased by 0.145%, with minimal impact from changes in individual and family characteristics over the five-year period. These results suggest that energy-saving behaviors, as actions in which all family members can participate, demonstrate temporal stability in their intergenerational transmission. However, pro-environmental behavioral motivations show intergenerational differences shaped by distinct social backgrounds. Future research should explore the intergenerational transmission of pro-environmental behavioral motivations across different cultural contexts to more comprehensively depict the formation process of pro-environmental behaviors.

(2) Intergenerational transmission of recycling and reuse behaviors. One study (Matthies et al., 2012) investigated the intergenerational transmission of waste paper recycling and reuse behaviors and its mechanisms among German elementary school students and their parents. The researchers recorded frequencies of two parental and child behaviors: waste paper sorting/recycling and waste paper reuse, while also measuring children's social and personal norms. Using structural equation modeling with multiple regression on 221 parent-child dyads, the results showed significant path coefficients between parents' and chil-

dren' s recycling behaviors, but non-significant coefficients for waste paper reuse behaviors. The researchers argued that recycling occurs most frequently in households where all members can observe it, allowing children to intentionally participate, whereas parents' reuse behaviors may not be as readily visible to children. Grønhøj and Thøgersen (2009, 2012) also found stronger correlations between parents' and children' s attitudes and behaviors for highly visible household waste sorting behaviors. Salazar et al. (2022) examined the intergenerational transmission of pro-environmental behaviors among 1,521 Chilean children (aged 9-10) and their parents, similarly finding stronger correlations with parental pro-environmental behaviors for actions with higher child participation (such as recycling lunch boxes) and more easily observable behaviors (waste sorting and recycling). Furthermore, structural equation modeling (Matthies et al., 2012) revealed that 75% of variance in children' s self-reported recycling behaviors was explained by parental recycling behaviors, children' s social norms, and personal norms. Parents' recycling behaviors not only directly predicted children' s recycling behaviors but also predicted children' s social and personal norms. These results demonstrate that parents' recycling behaviors can help children establish sound environmental behavior norms and promote increased recycling behaviors. In summary, intergenerational transmission effects exist for recycling and reuse behaviors, particularly for behaviors that children can directly observe.

(3) Intergenerational transmission of green consumption behaviors. Existing research has explored the intergenerational influence of Turkish mothers on daughters' sustainable consumption behaviors (Essiz & Mandrik, 2021), which include purchasing environmentally friendly products, donating old clothing, and green travel. Given that previous research used intergenerational correlation to measure transmission—a method that may exaggerate actual intergenerational similarity while ignoring baseline similarity due to reasons unrelated to family influence (Mandrik et al., 2005, 2018; Schindler et al., 2014)—researchers employed the nominal dyad method and multiple regression analysis on 146 parent-child dyads to control for such extraneous variables. The nominal dyad method involves creating randomly paired parent-child dyads to calculate average similarity scores for comparison with actual parent-child similarity, thereby determining whether similarity among actual family members exceeds chance levels. The findings revealed significant positive correlations between mothers' and daughters' sustainable consumption behaviors, with nominal dyad similarity scores being significantly higher than those of actual dyads. These results clearly demonstrate that sustainable consumption behaviors exhibit intergenerational transmission after accounting for nominal effects. The study further examined the moderating roles of family communication and peer influence, finding that higher frequency of mother-daughter communication corresponded to greater intergenerational similarity, while stronger peer influence corresponded to lower intergenerational similarity, with these two factors jointly explaining 46% of variance in the intergenerational transmission of sustainable consumption behaviors. In conclusion, intergenerational transmission exists for green

consumption behaviors between parents and children.

As research has progressed, scholars have developed novel methodological approaches to advance intergenerational transmission studies, such as using objective data to reflect pro-environmental behaviors and employing the nominal dyad method to test intergenerational correlations while controlling for extraneous variables like cohort effects. Additionally, we find that intergenerational transmission varies across different categories of pro-environmental behaviors. For less prominent household pro-environmental behaviors (such as reuse behaviors and electricity usage), parent-child correlations are relatively low, whereas for prominent, highly visible pro-environmental behaviors in daily life (such as recycling, waste sorting, and green consumption behaviors), intergenerational similarity is more pronounced. These differential results may reflect distinct transmission mechanisms for different pro-environmental behaviors, such as children' s ease of observing the behavior. Future research should deeply investigate the mechanisms underlying the intergenerational transmission of different categories of pro-environmental behaviors.

3. Mechanisms of Intergenerational Transmission of Pro-environmental Attitudes and Behaviors

As children' s socialization agents, parents' pro-environmental attitudes and behaviors exert particularly important influences on the formation of children' s pro-environmental attitudes and behaviors, with children regarding their parents as the most influential figures in shaping their own pro-environmental attitudes and values (Grusec, 2011; Parke & Buriel, 2008). Socialization theory also posits that parents can shape children' s pro-environmental attitudes and behaviors, and empirical studies have similarly found moderate positive correlations between parents' and children' s pro-environmental attitudes and behaviors (Essiz & Mandrik, 2021).

However, despite evidence of intergenerational associations in pro-environmental attitudes and behaviors, causal relationships demonstrating that parents influence children' s pro-environmental attitudes and behaviors through socialization processes remain unproven. Some scholars argue that family socialization is a dynamic, interactive process in which parents and children mutually influence each other (Serbin et al., 2015). Research has confirmed that children are not merely passive recipients in the socialization process (Davidov et al., 2015; Knafo-Noam et al., 2020); they can utilize knowledge gained from education, peers, or media to transmit their attitudes, values, and behaviors to their parents (Deng et al., 2022; Liu et al., 2022). Furthermore, in most families, parents and children live within shared sociocultural contexts, further complicating interpretations of intergenerational associations.

Based on socialization theory (Sears, 1983), the parent-child value similarity framework (Knafo-Noam et al., 2020), and an integration of existing research, we propose a bidirectional intergenerational transmission framework for pro-

environmental attitudes and behaviors (see Figure 1 [Figure 1: see original paper]). In this framework, parents and children constitute a dynamic intergenerational relationship as the transmission subjects; pro-environmental attitudes and behaviors serve as the transmission content, with attitudes preceding and influencing behaviors; and the degree of consistency in attitudes and behaviors between generations represents the transmission effect. This framework clarifies three processes in the intergenerational transmission of pro-environmental attitudes and behaviors: (1) direct or indirect transmission from parents to children (forward intergenerational transmission) through pathways of modeling learning, family communication, and parent-child participation; (2) reverse intergenerational transmission from children to parents; and (3) the influence of shared sociocultural environments on both parents and children (the process of enculturation). These three processes are complementary, dynamically constructed, and jointly promote the intergenerational transmission of pro-environmental attitudes and behaviors within families. Among them, parental direct/indirect transmission and reverse intergenerational transmission are dynamically constructed, with the former beginning in early childhood and continuing through adolescence, while the latter occurs more frequently in later adolescence. According to this framework, the transmission of pro-environmental attitudes and behaviors between parent and child generations is bidirectional, occurring through parent-child interactions. The following sections discuss the internal mechanisms of bidirectional intergenerational transmission, aiming to enrich and advance research on intergenerational transmission in environmental psychology and behavior.

3.1 Parental Direct or Indirect Transmission to Children

[Figure 1: see original paper] The Bidirectional Intergenerational Transmission Framework of Pro-environmental Attitudes and Behaviors

In families, parents'abilities, beliefs, traits, and behaviors are transmitted to children through direct or indirect means—the process of forward intergenerational transmission. Forward intergenerational transmission occurs at the family level and can also refer to transmission processes from older to younger generations within families (such as grandparents' influence on grandchildren). Through literature review, we have identified three pathways through which parents influence children's pro-environmental attitudes and behaviors: modeling learning, parent-child communication, and parent-child participation.

3.1.1 Modeling Learning The first pathway through which parents influence children' s pro-environmental attitudes and behaviors in families is children' s modeling learning from parental words and actions. According to social learning theory (Bandura, 1977), children primarily learn behaviors by observing and imitating parental actions to establish models, which are then reinforced in themselves. Through this process, children learn which behaviors are typical, valued, and emphasized by parents, with such behaviors serving a descriptive

normative function to some extent (Cialdini & Jacobson, 2021). Therefore, the association between children' s and parents' pro-environmental attitudes and behaviors results from children' s modeling learning of parental attitudes and behaviors, with parents and their actions potentially promoting children' s pro-environmental behavior development by serving as social models.

This pathway has received support from several studies. On one hand, children can directly perceive parental modeling behaviors. Empirical research by Jia and Yu (2021) demonstrated that children' s perceptions of parental pro-environmental behaviors partially mediate the intergenerational transmission of pro-environmental behaviors, with higher perceived frequencies of parental pro-environmental behaviors (such as how often they recycle) corresponding to more pronounced intergenerational transmission. Wallis and Klöckner (2018) also confirmed this pathway, finding that adolescents who perceived their parents as more energy-conserving in daily life were more willing to save energy than other adolescents. This occurs because teenagers may notice parents turning off lights when leaving rooms, inferring parents' intentions to conserve electricity and thereby learning this specific family norm and internalizing it as behavior.

On the other hand, parents' pro-environmental attitudes and behaviors may convey specific social norms (such as social responsibility) to children, thereby facilitating intergenerational transmission. For instance, Gong et al. (2021) found that parents' environmentally responsible consumption behaviors mediated the intergenerational transmission of green consumption values between Chinese parents and adolescent children (with a mediating effect of 43%). When parents hold high green consumption values, they influence children' s consumption values by demonstrating environmentally responsible consumption behaviors. The study also found that parent-child relationships could moderate the intergenerational transmission of green consumption values. Aruta and Paceño (2022) similarly discovered that Filipino parents who supported green purchasing indirectly influenced adolescents' attitudes toward purchasing environmentally friendly products by enhancing their sense of social responsibility, with the model explaining 25% of variance. The Philippines embraces socially oriented values that emphasize social cohesion and collective welfare; by modeling environmentally responsible behaviors, parents aim not only to protect the natural environment but also to promote adolescents' concern for collective interests. When children perceive parents' pro-environmental behaviors as responsibilities that promote common welfare and benefits for others, they are more likely to hold green purchasing attitudes.

However, some studies have found that children' s inability to directly perceive parental pro-environmental behaviors leads to non-significant associations. For example, a longitudinal study (Evans et al., 2018) tracking pro-environmental behavior data from 73 first and second-grade children and their mothers in New York between 2002 and 2014 found that mothers' pro-environmental behaviors did not significantly predict children' s pro-environmental behaviors. Similarly, Jia and Yu (2021) found no correlation between parents' and children' s energy-

saving behaviors (such as turning off heaters and air conditioners). Reasons for these inconsistent results include: first, paper recycling behaviors may be more easily observed by children than reuse behaviors or electricity usage; second, developmental stages may play a role. Non-significant parent-child correlations appear to emerge in early childhood when children have immature mental and value systems, making it difficult to understand the reasons behind parental behaviors through observation, internalize parental rewards and punishments for environmental behaviors (Matthies et al., 2012), or translate their own ideas into concrete environmental actions (Collado et al., 2017; Salazar et al., 2022). In contrast, significant parent-child correlations concentrate in adolescence, when teenagers may receive more environmental education at school, possess stronger understanding and cognitive abilities regarding environmental issues, more easily comprehend parents' pro-environmental attitudes and behaviors, and become more willing to participate in environmental activities with parents (Jia & Yu, 2021).

In summary, parents serve as social models, teaching children which behaviors are desirable through their own pro-environmental modeling or by conveying specific family rules or social norms, thereby influencing children' s pro-environmental attitudes and behaviors.

3.1.2 Family Communication For pro-environmental behaviors that children cannot directly observe, parents can transmit them through family communication—the second pathway through which family communication influences children' s pro-environmental attitudes and behaviors. Family communication refers to the process through which parents and children exchange information, viewpoints, emotions, or attitudes to enhance emotional connections or solve problems (Chi Liping, 2013). The cross-linked knowledge-attitude-action (KAA) model (Parth et al., 2020) posits that the transmission of climate change knowledge, attitudes, and behaviors across generations occurs through parent-child communication. According to Schönpflug (2001), more frequent and positive exchanges between parents and children regarding each other' s attitudes or values may yield greater intergenerational correlations.

Family communication is considered a key mechanism for attitude and behavior transmission, having been validated across domains including economic, political, and environmental attitudes and behaviors (Guo Pingping & Xin Ziqiang, 2020; Flanagan, 2013; Rosa et al., 2018). In the environmental domain, family communication influences children' s pro-environmental attitudes and behaviors primarily through discussions about environmental issues and the frequency and effectiveness of such communication.

On one hand, parents' environmental concern indirectly influences children's pro-environmental attitudes through the frequency of internal family communication about environmental issues. Eagles and Demare (1999) found that children who frequently discuss environmental issues at home exhibit higher levels of environmental concern. Valdez et al. (2018) also discovered that adolescent-parent

communication about global climate change significantly predicted family low-carbon behaviors, information-seeking behaviors, and transportation choices. Meeusen (2014) found that discussions about environmental pollution between parents and children mediated the intergenerational transmission of environmental concern. Specifically, the communication variable "How many times have you discussed environmental pollution problems with your parents?" indicated that parental environmental concern indirectly influenced children' s environmental concern through family communication, with the inclusion of communication increasing the explained variance to 0.3. Verachtert (2022) similarly found that higher frequency of internal family discussions about environmental issues corresponded to greater consistency in sustainable attitudes between parents and children. Evidently, parents who frequently discuss environmental issues with their children are more successful in transmitting pro-environmental attitudes across generations.

On the other hand, the effectiveness of parent-child communication positively correlates with the intergenerational transmission of sustainable consumption attitudes and behaviors. Essiz and Mandrik (2021) assessed mother-daughter communication through both objective (observed communication) and subjective (self-reported communication) measures. Observed communication, which depends on communication outcomes between dyad members, reflects communication effectiveness, whereas self-reported communication relies on members' self-assessments using scale items to evaluate perceived interpersonal communication within the dyadic relationship. The study found that both self-reported and observed communication were significantly positively correlated with the intergenerational transmission of sustainable consumption attitudes and behaviors. Additionally, family communication about environmental issues may activate individuals' moral norms, thereby promoting intergenerational transmission of pro-environmental behaviors. Matthies et al. (2012) found that parent-child communication about environmental issues activated children' s awareness of environmental consequences, which subsequently influenced their moral norms and prompted more pro-environmental behaviors.

The family communication patterns in the aforementioned studies primarily involve parent-led guidance and education—a top-down, unidirectional transmission within families that neglects the reverse process of transmission from children to parents. Future research should attend to the bidirectionality of family communication, examining whether children transmit environmental knowledge, attitudes, and behaviors to parents and how parent-child relationships and parenting styles might influence this bottom-up family transmission.

3.1.3 Parent-Child Participation The third pathway through which parents influence children's pro-environmental attitudes and behaviors in families is parent-child participation, referring to jointly engaging in ritualized family activities that foster children' s sense of social identity and family belonging through repeated and habitual practices. Examples include family outings (hiking trips)

or jointly participating in waste cleanup and recycling—activities characterized by repetition and habituation. According to socialization theory (Sears, 1983), family members live interdependently and trustingly; changes in one member' s behavioral habits can prompt adjustments throughout the family, creating convergence.

Empirical research supports this pathway. Katz-Gerro et al. (2019) examined the intergenerational transmission of pro-environmental behaviors across different social domains (including guided learning, parent-child participation, reciprocity, and control domains). Guided learning refers to parents' educational guidance regarding children' s pro-environmental behaviors; parent-child participation involves jointly engaging in environmental activities; reciprocity denotes equal partnership interactions where children and parents share common goals, solicit each other' s opinions, and respond to each other' s needs; and control domains refer to parents imposing punishment to control children' s behaviors when attitudinal or behavioral inconsistencies arise between generations. The results (Katz-Gerro et al., 2019) indicated that children' s pro-environmental behaviors (including sustainable lifestyles, energy conservation, and waste reduction) were jointly explained by parental pro-environmental behaviors and intergenerational socialization (with explanatory rates of 32%, 21%, and 33%, respectively). Within socialization domains, children' s participation in learning through having a voice, engaging as equal partners, and even participating in jointly conducted family environmental activities more effectively promoted intergenerational transmission of pro-environmental behaviors. In contrast, parental control and guided learning showed no significant effects on the intergenerational transmission of pro-environmental behaviors. Reciprocity and parent-child participation reflect "democratic-egalitarian" parent-child relationships, whereas guided learning and control reflect "authoritarian-submissive"relationships. These findings demonstrate that different parent-child relationships exert varying influences on the intergenerational transmission of pro-environmental behaviors, making parent-child relationships important variables in this process. Additionally, Jia and Yu (2021), in a Chinese cultural context, found that perceived parental behaviors, family communication, and parent-child participation fully mediated the relationship between parents' and children' s pro-environmental behaviors ($R^2 = 0.36$), with parent-child participation showing stronger mediating effects than family communication. Discussing environmental issues with children or asking them to engage in pro-environmental behaviors may be less effective than personally demonstrating these behaviors and jointly participating in them with children. Building on this, Jia et al. (2022) developed a 9-item parent-child environmental participation scale. Therefore, in the intergenerational transmission of pro-environmental attitudes and behaviors, if parents emphasize personal example over verbal instruction, children' s learning outcomes improve, their pro-environmental attitudes and behaviors align more closely with their parents' , and the intergenerational transmission effect strengthens.

This paper argues that for highly visible pro-environmental behaviors in fam-

ilies, parents transmit them to children through modeling; for less observable pro-environmental behaviors, parents must discuss environmental issues with children and jointly participate in environmental practices to effectively transmit environmentalism. Consequently, these three socialization pathways complement each other and work synergistically to promote the intergenerational transmission of pro-environmental attitudes and behaviors from parents to children.

3.2 Reverse Intergenerational Transmission from Children to Parents

Not only do parental influences on children play a role in the intergenerational transmission of pro-environmental attitudes and behaviors, but children' s influence on parents—the process of intergenerational 反哺—also necessarily functions in this transmission. Current research indicates that children can utilize knowledge gained from school education, peers, or media to transmit their attitudes, values, and behaviors to parents, resulting in intergenerational associations (Kuczynski & Parkin, 2007; Maccoby, 2007). This process is termed reverse intergenerational transmission, particularly referring to younger generations introducing new technologies and current social trends to older generations during rapid social change, as observed in domains such as internet information, leisure entertainment, and consumption behaviors.

Reverse intergenerational transmission can also extend to other family members, such as grandchildren influencing grandparents. The bidirectional theory of parent-child relationships (Kuczynski & Parkin, 2007) similarly posits that socialization processes within families are bidirectional and reciprocal, with both parents and children being active participants. While parents influence children' s development, children also influence parents' behaviors over time. Therefore, intergenerational associations in pro-environmental attitudes and behaviors may also result from children' s influence on parental attitudes and behaviors.

Currently, research on reverse intergenerational transmission of pro-environmental attitudes and behaviors remains limited. Žukauskiene et al. (2021) found that adolescent children attempt to influence parents' pro-environmental intentions and behaviors. Examining intergenerational transmission of pro-environmental behaviors in 508 Lithuanian families, they discovered that adolescents' awareness of environmental consequences (such as the environmental problems caused by single-use plastic bags) and behaviors aimed at influencing parents (such as asking parents to use eco-friendly shopping bags) positively predicted parents' pro-environmental intentions, subsequently affecting parents' pro-environmental behaviors. A qualitative study in a French cultural context also confirmed reverse socialization in the environmental domain (Gentina & Muratore, 2012), with interview results revealing that adolescents learned specific pro-environmental behaviors at school and attempted to influence their parents' knowledge and awareness of different environmental issues. Deng et al. (2022) explored the impact of children' s environmental commitments on parents' waste sorting and recycling behaviors,

similarly finding that when children made environmental commitments and shared waste sorting knowledge with parents, both children' s commitment rates and parents' environmental knowledge and normative beliefs significantly improved. This demonstrates that younger generations are not merely passive recipients but effective agents for promoting family sustainable development.

Furthermore, research indicates that parents do learn environmental knowledge and attitudes from their children (Rakotomamonjy et al., 2015). Liu et al. (2022) utilized 10,416 parent-child samples from the 2018 Programme for International Student Assessment (PISA) to explore reverse intergenerational transmission of environmental literacy (knowledge, attitudes, and behaviors). The results showed that children' s environmental literacy significantly predicted parents' environmental literacy, with parent-child interactions serving as mediators (structural equation model explanatory rate = 37%), and parent-child educational interactions proving more effective than daily interactions in transmitting environmental literacy to parents. Singh et al. (2020) similarly found in an Indian cultural context that adolescents' environmental concern significantly influenced parents' pro-environmental behavioral intentions, with parents' perceptions of adolescents' environmental knowledge and awareness of environmental reverse socialization mediating this pathway. In the process of environmental reverse socialization, parents do not simply and passively accept adolescents' information but rather achieve environmental socialization based on their own cognition and evaluation of adolescents' environmental knowledge. In conclusion, a reverse transmission process exists for pro-environmental attitudes and behaviors from adolescent children to parents.

3.3 The Role of Enculturation

Some scholars argue that intergenerational transmission between parent and child generations can occur not only within families but also within broader sociocultural contexts (Li Qiming, 2020). This stems from sociocultural contexts providing a shared environment where both generations internalize culturally emphasized values and develop corresponding adaptive capacities (Trommsdorff, 2012). This process is viewed as enculturation, with its core being cultural acquisition and transmission (Zhong Nian, 1993). Enculturation primarily occurs at the societal level, where older generations consciously or unconsciously guide and instruct younger generations to accept cultural thoughts and behaviors. Within a given culture, both parent and child generations are influenced by mainstream social values and exhibit typical or normative response patterns (Barni et al., 2013; Tam et al., 2012), resulting in parent-child similarity. According to Bourdieu's (1984) theory of cultural reproduction, culture is regarded as a resource that individuals can acquire and transmit to others, with parents passing on culturally advocated core concepts to children, enabling them to learn similar values, attitudes, and behavioral patterns to better adapt to society. Pro-environmental attitudes and behaviors, as cultural products, can also be transmitted from parents to children. Therefore, enculturation may repre-

sent an important factor influencing the association between parental and child pro-environmental attitudes and behaviors.

Existing research indicates that the intergenerational transmission of pro-environmental attitudes and behaviors exhibits clear cultural specificity. According to Grusec and Davidov (2010), practices successful in one cultural context may appear less successful in another, possibly because different cultural groups emphasize different social goals. For example, cross-cultural research (Katz-Gerro et al., 2019) revealed that in South Korea, intergenerational transmission of pro-environmental behaviors occurs more through parent-child participatory socialization, whereas in Israel and the United States, children' s pro-environmental behaviors more directly imitate parental behaviors. This suggests that in individualistic societies, transmission tends toward direct behavioral imitation, while in collectivist societies, transmission occurs through parent-child participation. South Korean families are deeply influenced by Eastern Confucian thought, emphasizing harmony between people and between humans and nature, and advocating participatory, family-oriented, environmentally beneficial behaviors (Rachmatullah et al., 2019). Furthermore, Ando et al. (2015) compared the intergenerational transmission of pro-environmental behaviors between Germany and Japan, finding that parents' recycling behaviors influenced children' s behaviors through perceived waste severity and subjective norms, with this effect being stronger in Japanese culture. Subjective norms refer to children' s perceptions of significant others' expectations, which play a more important role in determining pro-environmental behaviors in Japan than in Germany because Japanese culture is collectivist and places greater emphasis on interpersonal relationships and meeting others' expectations.

In summary, these studies demonstrate that families serve as important venues for completing enculturation. The intergenerational transmission effects identified across different cultures show some variation, likely resulting from shared cultural factors that lead parents and children to exhibit similar attitudes and behaviors.

4. Summary and Future Directions

Integrating existing research findings, evidence demonstrates intergenerational transmission effects for pro-environmental attitudes and behaviors. Theoretical and empirical studies indicate that the intergenerational transmission of pro-environmental attitudes and behaviors primarily involves three processes: (1) transmission from parents to children through direct or indirect means (forward intergenerational transmission), including modeling learning, family communication, and parent-child participation; (2) reverse intergenerational transmission from children to parents; and (3) the influence of broadly shared sociocultural environments on both parents and children (the process of enculturation). These three processes are complementary, dynamically constructed, and jointly promote the intergenerational transmission of pro-environmental attitudes and behaviors within families. Social learning theory, socialization theory, the cross-

linked KAA model, the bidirectional theory of parent-child relationships, and cultural reproduction theory respectively support or explain these processes. Current research exhibits several limitations that can guide future research directions.

4.1 Constructing Dynamic Models of Intergenerational Transmission and Strengthening In-Depth Mechanism Research

Intergenerational transmission is a continuous and changing process, yet few studies have examined its dynamic changes. According to family systems theory, the family is a hierarchical, dynamic system whose internal subsystems are interconnected and mutually influential (Bowen, 1966), with parent-child relationships being crucial components. Parent-child relationships in families undergo dynamic changes with individual age development (Sabol et al., 2021; Xia & Li, 2022; Žukauskiene et al., 2021), leading to corresponding dynamic changes in the intergenerational transmission of pro-environmental attitudes and behaviors (Grusec & Davidov, 2010).

According to individual developmental stage theory, the intergenerational transmission of pro-environmental attitudes and behaviors occurs during childhood. During this period, parents serve as children's primary social agents, and parent-child relationships are unidirectional and top-down, playing a dominant role in transmission. As children age into adolescence, enhanced autonomy and questioning of parental authority disrupt the original unidirectional relationship, shifting from parent-dominated unidirectional authority to relatively equal relationships between both parties. Due to this transformation in parent-child relationships, the unidirectional intergenerational transmission model of pro-environmental attitudes and behaviors begins to change, giving rise to reverse intergenerational influence from children to parents.

In summary, as individuals develop, unidirectional parent-child relationships gradually transform into bidirectional ones, and daily pro-environmental attitudes and behaviors within families shift from unidirectional transmission to bidirectional interactive models. In early childhood, forward transmission dominates and continues developing; in later adolescence, children' s reverse intergenerational transmission emerges. Forward and reverse intergenerational transmission complement and mutually reinforce each other, jointly forming a bidirectional intergenerational transmission model. Moreover, intergenerational transmission does not negate individuals' self-developed pro-environmental attitudes and behaviors. Some researchers suggest that children' s time spent outdoors also influences pro-environmental attitudes and behaviors (Evans et al., 2018). Therefore, future research should longitudinally track parent-child interactions and children' s developmental trajectories to explore dynamic patterns of bidirectional intergenerational transmission and further reveal pro-environmental attitudes and behaviors acquired through both natural development and intergenerational transmission.

Additionally, research on intergenerational transmission mechanisms lacks depth. Most existing studies are empirical investigations based on simple measurements of single variables within family systems (communication frequency, parent-child participation patterns) that cannot present the full picture of transmission mechanisms. Therefore, future research should consider other socialization factors in parents and children, such as parental characteristics (agreeableness, wisdom, empathy), child characteristics (intelligence, expressiveness, enthusiasm), parent-child relationship types, parenting styles, family atmosphere, time spent together, duration of discussions or exchanges about environmental issues, and different communication methods, which will deepen our understanding of how parents transmit pro-environmental attitudes and behaviors to children. Furthermore, large sample sizes in some literature make significance tests more sensitive and more likely to yield significant statistical results (Meeusen, 2014). To avoid this influence, future research should supplement more experimental and qualitative studies to better confirm the robustness of conclusions.

4.2 Conducting Horizontal Socialization Research and Strengthening Indigenous Studies

Although current research has identified parents as primary influences in children' s formation of pro-environmental attitudes and behaviors, explaining some variance, considerable variance remains unexplained. Future research should incorporate other socialization factors, such as peer influence, school education, and social media, to deeply investigate their impacts on children' s pro-environmental attitudes and behaviors.

Current research predominantly focuses on Western countries, with domestic studies being relatively scarce. Reviewing existing research, we believe cultural factors may influence the intergenerational transmission of pro-environmental attitudes and behaviors. Some researchers note (Singh et al., 2020) that culture can shape different dynamic relationships between parents and children, leading to different intergenerational transmission processes for pro-environmental attitudes and behaviors. For example, authoritative parenting styles prevalent in low power distance and individualistic cultures feature more equal parent-child relationships, with parents encouraging children to express and share their viewpoints (Pinquart & Kauser, 2018), resulting in stronger reverse intergenerational transmission from children to parents. In contrast, authoritarian parenting styles common in high power distance and collectivist cultures emphasize hierarchical parent-child relationships that may restrict communication (Garcia et al., 2019), leading to greater parental influence on children. Evidently, considering cultural factors is important for better understanding the intergenerational transmission of pro-environmental attitudes and behaviors (Xia & Li, 2022).

Therefore, future research should investigate the mechanisms of pro-environmental attitude and behavior transmission within Chinese cultural

contexts and conduct cross-cultural comparisons. For instance, based on traditional Chinese concepts of respecting elders, parent-child relationships warrant in-depth exploration regarding whether they facilitate or hinder transmission. Particularly amid globalization and informatization, Chinese family relationships are rapidly transitioning from traditional to modern patterns, with the traditional "father-son" unidirectional transmission model evolving toward equal intergenerational relationships and children' s reverse socialization of parents. In summary, during China' s social transformation period, examining the intergenerational transmission mechanisms of pro-environmental attitudes and behaviors from a cultural perspective will not only improve parent-child relationships and promote sustainable family practices but also deepen understanding of cross-cultural universality and specificity.

4.3 Domain Specificity of Intergenerational Transmission of Pro-environmental Attitudes and Behaviors

Currently, increasing scholars are discovering intergenerational transmission effects and mechanisms across more domains. For example, attachment transmission mechanisms include sensitive parenting and parental mentalization levels (Van Ijzendoorn & Bakermans-Kranenburg, 2019); self-regulation transmission mechanisms include parenting styles and parent-child relationships (Bridgett et al., 2015); anxiety transmission primarily occurs through dynamic parent-child processes (dyadic synchrony and emotional mimicry) (Perlman et al., 2022); violent behavior transmission is explained through social learning, criminal environments, genetic factors, and judicial bias (Besemer et al., 2017); transmission mechanisms for variables such as subjective well-being, emotional intelligence, and core self-evaluation all focus on mediating and moderating roles of parental characteristics, parent-child relationships, and interactions (Fan Hang et al., 2019; Huang Jie et al., 2022; Ma Shutao et al., 2021); and economic attitudes and behaviors are transmitted through observational learning, parent-child interaction socialization pathways, and genetic pathways (Guo Pingping & Xin Ziqiang, 2020).

Through comparison, we find that like these domains, pro-environmental attitudes and behaviors follow the forward transmission pattern from parent to child generation and emphasize internal mechanisms involving parental characteristics and parent-child relationships. However, some environmental domain studies have found that children possess subjective agency and can also influence parents' pro-environmental attitudes and behaviors. This demonstrates that the intergenerational transmission of pro-environmental attitudes and behaviors exhibits domain specificity.

This domain specificity may originate from two aspects: first, compared to other abstract psychological variables, the environmental domain is more closely related to daily life and more socialized, with pro-environmental attitudes and behaviors being more common and concrete psychological variables in parent-child daily life. Moreover, the intergenerational effects of parental and child pro-

environmental attitudes and behaviors are relatively stable and intuitive, with intergenerational correlations ranging between 0.15 and 0.53. Second, compared to psychological variables in other domains, individuals' pro-environmental attitudes and behaviors reside at the cultural surface level of society and are more likely to change amid social transformation. Zhou Xiaohong (2000) noted that children' s influence on parents is multifaceted but most evident at the cultural surface level (daily behaviors or material aspects). With social change and technological innovation, children clearly possess more information than parents regarding environmental knowledge, ecological concepts, and cultural trends, making them more likely to socialize parents within families. In summary, future research should deeply explore potential mechanisms of intergenerational transmission across different domains, summarizing both domain universality and domain specificity to better understand the formation and development of individual psychological and behavioral patterns.

4.4 Promoting Practical Application of Research Findings

As China' s principal social contradiction has changed, the people' s demand for beautiful ecological environments continues to grow. It is necessary to apply research findings from the field of environmental psychology and behavior intergenerational transmission to reality, continuously meeting people' s needs and thereby enhancing residents' well-being by optimizing family ecological services. First, since the intergenerational transmission of parental environmentalism to children depends on family communication and parent-child participation, parents should encourage children to discuss environmental issues, such as how environmental pollution, extreme weather, biodiversity loss, and natural resource crises affect our lives, and help children integrate abstract environmental thinking into daily life. Second, we can organize more parent-child activities in families, such as transforming waste into treasure, plant adoption, waste sorting point-exchange programs, Ant Forest low-carbon emission reduction initiatives, trade-in programs, and old clothing donations. Through intergenerational interactions in parent-child participation in pro-environmental behaviors, parent-child relationships are strengthened, which benefits individual physical and mental health (Netuveli & Watts, 2020), enhances life satisfaction, and thereby increases residents' well-being (Schmitt et al., 2018).

Second, to encourage children' s reverse environmental education of parents, optimizing intergenerational relationships and family parenting styles is equally essential. Schools and communities can conduct parent-child activities to intervene in communication and participation patterns between generations, making intergenerational relationships more equal and thereby indirectly enhancing reverse intergenerational transmission of environmental concepts. Moreover, within families, children should be more involved in daily labor and waste sorting management, enabling them to grasp and practice environmental knowledge and norms from real-life experiences, cultivate appropriate pro-environmental attitudes, and directly influence parents' environmental philosophies, thereby

achieving the goal of "small hands pulling big hands." Therefore, to realize sustainable environmental development and promote the universal popularization and internalization of ecological civilization consciousness, constructing a family-based environmental education mechanism with participation from both parent and child generations is essential.

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The phenomenon and mechanism of intergenerational transmission of pro-environmental attitudes and behaviors

Li Xin[1], Liu Zhenhui[3], Luo Jie[4], Jin Tonglin[1],[2], Jia Yanru[1], Wu Yuntina[1],[2]

[1] School of Psychology, Inner Mongolia Normal University, Hohhot 010022, China
[2] Mental Health Education Research and Service Base, Key Research Base of Humanities and Social Sciences in Inner Mongolia Colleges and Universities, Hohhot 010022, China
[3] College of Teacher Education, Honghe University, Mengzi 661199, China
[4] School of Psychology, Guizhou Normal University, Guiyang 550025, China

Abstract: There is a phenomenon of intergenerational transmission of pro-environmental attitudes and behaviors. Ample studies on intergenerational transmission of pro-environmental attitudes primarily focus on environmental values, environmental concern, sustainable consumer attitudes, while researches on intergenerational transmission of pro-environmental behaviors pay much attention to saving energy behaviors, green purchase behaviors, and recycling behaviors and reuse behaviors. The intergenerational transmission has three interdependent pathways of socialization: (1) parents influence their children, through modeling learning, parent-child communication, parent-child participation; (2) children influence their parents, that is, the process of reverse intergenerational transmission; (3) parents and children are influenced by the shared social and cultural environment, that is, the process of cultural acculturation. In the future, it is necessary to strengthen the research on the intergenerational transmission of pro-environmental attitudes and behaviors in the context of Chinese culture, and explore its internal mechanism in depth.

Keywords: intergenerational transmission; pro-environmental attitudes behaviors; transmission mechanism; reverse intergenerational transmission; enculturation

Note: Figure translations are in progress. See original paper for figures.